Amendments to the Drawings:

The Drawings were amended as follows:

(1) Layer 2170 in Fig. 2g was deleted and was replaced with layer 2160 to which the pattern of layer 2170 of Fig. 2f is transferred and has a regular array of holes.

(2) Figs. 3b and 4b were amended by deleting the dotted pattern in Figs. 3b and 4b thereby showing the air spaces. The air spaces do not have any pattern.

Replacement sheets containing amended Figs. 2g, 3b and 4b are enclosed.

REMARKS

Claims 1-33 are in this application. Claims 3-4 and 13-33 had been canceled.

New claims 34-35 have been added. Claims 34 –35 correspond to the previously canceled claims 3-4 and, as such, are supported by the specification.

Previously withdrawn claims 2, 5, and 6, which had been improperly withdrawn, have now been reverted to their original status. This was accomplished by adding the status identifier "original" after the claim numbers of claims 2, 5, and 6.

Claims 1, 7-12 are currently amended by deleting:

"wherein said regions of robust support dielectric form an array of pillars; and wherein said regions of robust support dielectric form support beams that lie below said interconnect lines and encase at least one of said conducting via;"

and adding therefor the following:

"said cap layer comprising an array of holes, there being a plurality of said holes disposed over said air gap."

Claim 6is amended to delete "cap layer is a dielectric barrier comprising a regular array of holes which" and substituting "holes" therefor.

The Drawings are amended as follows:

(1) Fig. 2g is missing layer 2160. Layer 2160 is the layer to which the pattern of layer 2170 of Fig. 2f is transferred. Thus, the pattern in 2170 of Fig. 2f is transferred to layer 2160, which has a regular array of holes. This layer was inadvertently left out of Fig. 2g. Accordingly, layer 2170 in Fig. 2g is deleted and is replaced with layer 2160 to which the pattern of layer 2170 of Fig. 2f is transferred and has a regular array of holes.

The text of the specification is consistent with this amendment. Thus, on page 29, lines 4 to 13, the specification states:

"Referring to Fig. 2f, a stencil 2170 with columnar holes is formed over the barrier film to extract the sacrificial dielectrics through the barrier layer and the optional hardmask, as shown in Fig. 2f.

Referring to Fig. 2g, the columnar hole pattern is subsequently transferred through the barrier layer and the optional hard mask using a reactive ion etch (RIE) process and the sacrificial dielectrics 2110 and 2130 are extracted. The stencil 2170 can either be a permanent part of the structure, or be sacrificial, as shown in Fig. 2g."

Accordingly, the present amendment of Fig. 2g does not add new matter.

(2) Figs. 3b and 4b do not show the air spaces. The air spaces were inadvertently left out from Figs. 3b and 4b in the figures.

Accordingly, Figs. 3b and 4b were amended by deleting the dotted patterns in Figs. 3b and 4b thereby showing the air spaces. The air spaces do not have any pattern. This feature was inadvertently left out and is now corrected.

The text of the specification is consistent with the figures, as amended. Thus, on page 30, line 28 to page 31, line 25, the specification states:

> "Referring to Figs. 3a and 3b, in another embodiment of the present invention, Instead of the flat barrier 2160, a selective metal cap 2180 is used to cap the copper wire. The stencil film 2170 with columnar holes is formed directly over the selective metal cap and sacrificial dielectric if no hard mask layer is used or over the selective metal cap and the hard mask layer if one is used. The selective metal cap is a conductive barrier layer can be Ta, TaN, W, WN, Ti, TiN, TiSiN, TaSiN, Co-P, Co-W-P, Co-Sn-P and combinations thereof. PVD, CVD, ALD, electroless plating or electrolytic plating coupled with etching and polishing can be used to selectively form the cap only on the copper wire feature surfaces. The sacrificial dielectric can then be extracted at this stage or extracted after a multilevel build is performed through the perforated stencil films present at each level as shown in Figs. 3a and 3b.
>
> Referring to Fig. 4, in still another embodiment of the present invention, in place of the sacrificial dielectric 2110 and permanent 2120, one permanent dielectric 2190 is used and the sacrificial dielectric 2130 is deposited on top of it. Following this, after the dual damascene build and stencil film 2170 deposition, hole transfer into the barrier layer and hard mask, the sacrificial dielectric 2130 is extracted leaving an air gap only at the line level as shown in Fig. 4.
>
> Such a structure is more robust mechanically than the structure depicted in 2g, but has a higher effective capacitance. This embodiment does not require an additional lithographic step to define a line holder dielectric 2120 and is thus easier to fabricate than the first embodiment.
>
> The permanent dielectric 2190 can be made of the same materials as those used to make the permanent dielectric film 2120."

Replacement sheets containing amended Figs. 2g, 3b and 4b are enclosed.

In the preferred embodiment, a dielectric layer is etched to have an array of holes. These holes are used to extract the nonmetal material between the lines to

create the air spaces. In the preferred embodiment, the array of holes is refilled as recited in claim 6. However, the holes do not have to be refilled. Amended claims 1 and claims 2-12 each reads on Figs. 2, 3 and 4 and on the elected species of Fig. 2a to 2h.

Fig. 3 differs from Fig. 2 in that layer 2180 is added in Fig. 2 to increase the height of the air space. In Fig. 4, the material 2190 is left in, leaving a thinner air space. The material 2190 provides a thicker support thereby making the structure more structurally robust. This is described on page 31, lines 11-25, of the specification, as shown herein above in the quote from the specification.

Attorney Daniel P. Morris, Esq., has contacted the Examiner regarding the Examiner's withdrawal of claims 2-12 from consideration. The examiner may have understood that the comments in the Response submitted on March 25, 2005 were to mean that the applicant considered only claim 1 to read on the selected species of Fig. 2a to 2h. Applicants respectfully request that this misunderstanding be corrected and the claims 2-12 returned to their originally presented status, and not kept at the "withdrawn" status.

Claim 1 was rejected under 35 USC §102(b) as being anticipated by: (1) Grill et al. (U.S. Patent No. 6,413,852); (2) Grill et al. (U.S. Patent No. 6,737,725); or (3) Cotte et al. (U.S. Patent No. 6,346,486).

None of the references previously cited by the examiner teach or suggest the currently pending claims 1, 2, 5-12, and 34-35 which recite:

"said cap layer comprising an array of holes, there being a plurality of said holes disposed over said air gap," whether the holes are filled or unfilled.

These features are not taught or suggested by either Grill et al. (U.S. Patent No. 6,413,852), Grill et al. (U.S. Patent No. 6,737,725) or Cotte et al. (U.S. Patent No. 6,346,486). Thus, none of the cited art teaches or suggests the structures defined by amended claims 1-2, 5-12, and the newly added claims 34-35. Therefore, claims 1-2, 5-12, and the newly added claims 34-35 are not anticipated by the cited art and, as such, claims 1-2, 5-12, and the newly added claims 34-35 are allowable.

In view of the foregoing, Applicants respectfully request reexamination of this application and allowance of the pending claims, namely claims 1-2, 5-12, and newly added claims 34-35.

Respectfully submitted,

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